


# REPORT DOCUMENTATION PAGE

Form Approved  
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE June 4, 2001	3. REPORT TYPE AND DATES COVERED FINAL 01 Jun 97 - 30 Nov 00	
4. TITLE AND SUBTITLE ALL OPTICAL BINARY FLIP-FLOP GATE FOR PHOTONIC SERIAL TO PARALLEL INTERFACES		5. FUNDING NUMBERS DAAG55-97-1-0161	
6. AUTHOR(S) Dr. William W. Clark, III			
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) CREOL UNIVERSITY OF CENTRAL FLORIDA P.O. BOX 162700 ORLANDO, FL 32816-2700		8. PERFORMING ORGANIZATION REPORT NUMBER 	
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES) U.S. ARMY RESEARCH OFFICE P.O. BOX 12211 RTP, NC 27709-2211		10. SPONSORING / MONITORING AGENCY REPORT NUMBER 37286-EL •1	
11. SUPPLEMENTARY NOTES THE VIEWS, OPINIONS, FINDINGS CONTAINED IN THIS REPORT ARE THOSE OF THE AUTHOR AND SHOULD NOT BE CONSTRUED AS A OFFICIAL DEPARTMENT OF THE ARMY POSITION, POLICY OR DECISION, UNLESS SO DESIGNATED BY OTHER DOCUMENTATION.			
12a. DISTRIBUTION / AVAILABILITY STATEMENT APPROVED FOR PUBLIC RELEASE, DISTRIBUTION UNLIMITED		12b. DISTRIBUTION CODE	
13. ABSTRACT (Maximum 200 words)  This project addresses key compnent technologies for enabling the fusion of data between the transmission lines and the receivers in optical communication network systems. This year involved the optimization and testing of an integrated flip-flop device, fabrication of an integrated divide-by-8 optical clock counter/sequencer, and development of a serial to parallel converter.			
14. SUBJECT TERMS SEMICONDUCTOR OPTOELECTRONIC DEVICES; ALL OPTICAL WAVEGUIDE SWITCHES, ULTRAFast OPTICAL DEVICES		15. NUMBER OF PAGES 2	
		16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT UNCLASSIFIED	18. SECURITY CLASSIFICATION OF THIS PAGE UNCLASSIFIED	19. SECURITY CLASSIFICATION OF ABSTRACT UNCLASSIFIED	20. LIMITATION OF ABSTRACT UL

20010621 074

**REPORT DOCUMENTATION PAGE (SF298)**  
**(Continuation Sheet)**

The aim of this project was to demonstrate the use of optoelectronic feedback to realize hybrid all-optical switching devices which when integrated can form functional circuits. The devices chosen for demonstration were an integrated flip-flop device, an integrated divide-by-8 optical clock counter/sequencer, and a serial to parallel converter. The important results were:

- ◆ Fabrication and optimization of MSM structures at waveguide outputs and integration into a complete flip-flop device. The past years work involved the completion of the optoelectronic feedback for flip-flop operation
- ◆ Fabrication, characterization, and optimization of an ultrafast all-optical demultiplexer. The past years work involved the fabrication of a fully integrated device using an improved mask set and determination of the tolerance of the device operating characteristics to high repetition rate switching.

**Publications:**

X. dong, P. LiKamWa, J. Loehr, and R. Kaspi, "Current-induced guiding and beam steering in active semiconductor planar waveguide," IEEE Photon. Tech. Lett., V11, PP.809-811, July 1999.

**Participating Personnel:**

Xuesong Dong      Student, UCF  
Patrick LiKamWa    Professor, UCF

**Inventions:**

Monolithic Integrated Active Semiconductor Optical Waveguides for 1xN Interconnect Switch